

Patent Claims

1. Radiometric measuring device for mounting at a container
(3) fillable with a filling substance (1), comprising
5 - a radioactive source (5), which, in operation, sends
radioactive radiation through the container (3),
- at least two detectors (D_i),
--which serve for registering radiation passing through the
container (3) and for producing an electrical pulse rate
10 (N_i) corresponding to the registered radiation,
- offset generators (19), which superimpose on the pulse rate
(N_i) of each detector (D_i) an offset (O_i) representing a
status of such detector (D_i), and
- a collector line (21),
15 --to which each detector (D_i) feeds an output signal
corresponding to the superimposing of its pulse rate (N_i)
and its offset (O_i),
--which feeds to a superordinated unit (23) a sum signal
corresponding to the superimposing of the output signals,
20 ---with the superordinated unit (23) deriving, on the basis
of the sum signal, a measurement signal and/or a status
of the measuring device.
2. Radiometric measuring device for mounting at a container
25 (3) fillable with a filling substance (1), comprising
- a radioactive source (5), which, in operation, sends
radioactive radiation through the container (3),
- at least two detectors (D_i),
--which serve for registering radiation passing through the
30 container (3) and for producing an electrical pulse rate
(N_i) corresponding to the registered radiation,
- offset generators (19), which superimpose on the pulse rate
(N_i) of each detector (D_i) a detector-specific offset (O_{di}),
- turn-off switches (33), which serve for suppressing

transmission of pulse rate (N_i) and offset (O_{di}), when a detector (D_i) malfunctions,

- a collector line (21),

--to which each properly working detector (D_i) feeds an output
5 signal corresponding to the superimposing of its pulse
rate (N_i) and its offset (O_{di}), and

--which feeds to a superordinated unit (23) a sum signal
corresponding to the superimposing of the output signals,

---with the superordinated unit (23) deriving, on the basis
10 of the sum signal, a measurement signal and/or a status
of the measuring device.

3. Radiometric measuring device as claimed in claim 1 or 2,
wherein

15 - a series of detectors (D_i) is provided, and

- the collector line (21) begins at a first detector of the
series,

- leads from there from one detector (D_i) to the detector
(D_{i+1}) neighboring such, and from the last detector to the
20 superordinated unit (23).

4. Radiometric measuring device as claimed in claim 1 or 2,
wherein each detector (D_i) comprises a scintillator (7) and
a photomultiplier (9) appended thereto.

25 5. Radiometric measuring device as claimed in claim 4, wherein
the offset-generators (19) send periodic reference light
flashes through the scintillator (7) via a light conductor
(49).

30 6. Radiometric measuring device as claimed in claim 3, wherein
the superordinated unit (23) is integrated in the last
detector of the series.

7. Method for measuring a physical variable with a radiometric measuring device as claimed in one of the preceding claims, wherein

- 5 - a desired value (O_{si} , O_{di}) for an offset is assigned to each detector, the offset generators (19) of the detectors (D_i) generate the desired value, when the detector is working properly, and the desired value is greater than the sum of the maximum expected pulse rates (N_i^{max}) for the detectors (D_i), and wherein
- 10 - the superordinated unit (23) determines a total count rate (G) on the basis of the sum signal,
- forms the difference (D) between this total count rate (G) and a count rate corresponding to the sum of the desired values (O_{si} , O_{di}) of the offsets,
- 15 - recognizes, that an error is present, when the difference (D) is negative, and
- in the case of positive difference (D), derives a measurement signal.

20 8. Method for measuring a physical variable as claimed in claim 7, wherein, in the case of a negative difference (D), it is determined on the basis of a mathematical method (e.g. difference), which of the detectors (D_i) is malfunctioning.

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9. Radiometric measuring device for mounting at a container (3) fillable with a filling substance (1), comprising

- a radioactive source (5), which, during operation, sends radioactive radiation through the container (3),
- 30 - first and second detectors (D_1 , D_2),
- which serve for registering radiation passing through the container (3) and for producing an electric pulse rate (N_1 , N_2) corresponding to the registered radiation,
- an offset-generator (19), which superimposes on the pulse

rate (N_1) of the first detector (D_1) an offset (O_1) reflecting a status of the first detector (D_1), and,
- integrated in the second detector (D_2), a superordinated unit (23),
5 --with which the first detector (D_1) is connected via a connecting line (37),
---via which the first detector (D_1) feeds an output signal corresponding to the superpositioning of the pulse rate (N_1) and the offset (O_1),
10 --to which the pulse rate (N_2) and a status of the second detector (D_2) are fed, and
--which, on the basis of the incoming signals, derives a measurement signal and/or a status of the measuring device.

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10. Radiometric measuring device for mounting at a container (3) fillable with a filling substance (1), comprising
- a radioactive source (5), which, during operation, sends radioactive radiation through the container (3),

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- first and second detectors (D_1 , D_2),
--which serve for registering radiation passing through the container (3) and for producing an electric pulse rate (N_1 , N_2) corresponding to the registered radiation and for transmitting an output signal corresponding to the pulse
25 rate (N_1 , N_2) to a superordinated unit (23),

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- wherein the source (5) has a strength, in the case of which, for each detector (D_1 , D_2), always a minimum pulse rate (N_i^{\min}) greater than zero is to be expected,
- wherein, in each detector (D_1 , D_2), a turn-off switch (45)
30 is provided, which suppresses transmission of the output signal to the superordinated unit (23), when the detector (D_i) is malfunctioning, and
- wherein the superordinated unit (23) derives a measurement signal and/or a status of the measuring device on the basis

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of the output signals.